

What is Claimed Is:

1 A method for transferring heat from a heat source at a first temperature to a heat sink at a second temperature higher than the first temperature, comprising the steps of:

(a) transferring heat from a heat source via a first heat carrying medium at a first temperature to a heat temperature raising medium which comprises a fluid capable of
5 undergoing a reversible phase change from liquid to solid upon the application of pressure, said heat transfer taking place at a first temperature and pressure;

(b) changing the pressure applied to said heat temperature raising medium from said first pressure to a second pressure;

(c) transferring heat via a latent heat of fusion from said heat temperature raising
10 medium to a heat sink at a second temperature higher than said first temperature in said heat source via a second heat carrying medium.

2 A method as claimed in claim 1, wherein the step of transferring heat from a heat source to a heat temperature raising medium includes transferring heat to an assembly containing said heat temperature raising medium, said assembly comprising one of a multiple tube assembly, or a multiple connected conduit assembly.

3 A method as claimed in claim 2, wherein the assembly includes heat conductive fins positioned within conduits, or tubes.

4 A method as claimed in claim 3, wherein said assembly comprises a multiple tube assembly, and wherein said method of changing the pressure applied to said heat temperature raising medium comprises changing the pressure via a pressurizing device.

9 5 A method as claimed in claim 2 or 3, wherein the step of transferring heat from a heat source via a first heat carrying medium, comprises transferring sufficient heat such that the first heat carrying medium undergoes a partial or complete phase change from vapor to liquid or from liquid to solid, and said heat temperature raising medium undergoes a
5 partial or complete phase change from solid to liquid; and

wherein said step of transferring heat via a latent heat of fusion from said heat temperature raising medium to a heat sink comprises transferring sufficient heat from said heat temperature raising medium to said second heat carrying medium, such that said second

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10 heat carrying medium is at least partially vaporized and said heat temperature raising medium is at least partially solidified.

6 A method as claimed in claim 5, wherein the assembly includes conduits, and wherein a heat conductive fin is positioned in at least one of said conduits for heat passage.

7 A method as claimed in claim 5, wherein the second heat carrying medium receives heat via contact with the surface of the conduits containing the heat temperature raising medium, and wherein the heat temperature raising medium is thereby condensed.

8 A method as claimed in claim 5, wherein the second heat carrying medium is a vapor generated from vaporization of liquid second heat carrying medium on the surface of said conduits, the heat temperature raising medium thereby being condensed.

5 9 A method as claimed in claim 5, wherein the method further includes at least partially vaporizing the first heat carrying medium by one of an indirect contact heat exchange between the heat carrying medium and a heat source, a flash vaporization of the heat carrying medium thereby producing a chilled liquid of the heat carrying medium, a simultaneous vaporization and freezing operation thereby producing a mass of solid process substance from the chemical feeds or by using a vapor from a last effect of a multieffect evaporator as the first heat carrying medium vapor.

10 A method as claimed in claim 9, wherein the second heat carrying medium is brought into a heat exchange relation with an at least partially solid process substance from the solidification of the chemical feeds, thereby simultaneously melting the solid process substance and condensing the second heat carrying medium.

9 11 A method as claimed in claim 2 or 3, wherein the heat temperature raising medium is selected from the group consisting of an organic or inorganic chemical, and mixtures thereof, either in a pure form or in a compound with a melting range of between -30°C and 100°C, with the proviso that when the heat temperature raising medium is selected from a mixture of compounds, the mixture has a eutectic point range between -30°C and 100°C.

12 A method as claimed in claim 5, wherein the operating temperature of the said first heat carrying medium is above 0°C.

13 A method as claimed in claim 5, wherein the first heat carrying medium is selected from the group consisting of organic chemical.

14 A method as claimed in claim 2 or 3, wherein the step of transferring heat from a heat source via a first heat carrying medium comprises transferring heat via a multiple set of heat temperature raisers thereby elevating the heat temperature raising medium in multiple steps.

15 A method as claimed in claim 2 or 3, wherein said process is used in air-conditioning distillative freezing, ice making, cable water purification, waste water treatment, desalination, distillation operation under ambient temperature or high temperature, organic chemical purification and separation, or in any other process requiring the use of raising the temperature from a lower temperature heat source to a high temperature heat sink.

16 An apparatus for transferring heat from a heat source at a first temperature to a heat sink at a second temperature higher than said first temperature, comprising:

a first heat carrying medium contained within a first enclosure, a heat temperature raising medium contained within a tube, or a multiple tube assembly, or multiple connected conduit assembly and in heat transferring contact with said first heat carrying medium for receiving heat from said first heat carrying medium, a second heat carrying medium in heat transferring contact with said heat temperature raising medium for transferring heat from said heat temperature raising medium to said second heat carrying medium, and a pressurizing device in fluid contact with said heat temperature raising medium for raising and lowering hydrostatic pressure applied to said heat temperature raising medium in accordance with said receiving or transferring heat.

17 An apparatus as claimed in claim 16, wherein said apparatus includes valves for providing contact between said first heat carrying medium and said heat temperature raising medium and between said heat temperature raising medium and said second heat carrying medium.

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18 An apparatus as claimed in claim 16, wherein said heat temperature raising medium is contained within a plurality of conduits.

19 An apparatus as claimed in claim 18, wherein said conduits are in fluid communication with a movable piston or other pressurizing device for varying the hydrostatic pressure on said heat temperature raising medium.

20 An apparatus as claimed in claim 18, further including a heat conductive fin unit in each of said conduits.

21 An apparatus as claimed in claim 17, wherein said valves comprise a plurality of gates for one way passage of vapor.

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22 An apparatus as claimed in claim 21, wherein said plurality of gates comprises at least one divider made of screen or mesh for structural support and vapor passages with thin film flaps secured to said divider.

23 Valve apparatus for the passage of vapor comprising a plurality of gates for one way passage of vapor, wherein the said gates further comprise at least one divider made of screen or mesh for structural support and vapor passages with thin film flaps secured to said divider.

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